preheated to their respective operating temperatures before the test begins.

(4) Adjust the sample flow rates to the desired flow rate and set the gas flow measuring devices to zero.

(i) For gaseous bag samples (except THC samples), the minimum flow rate is 0.17 cfm (0.08 liters/sec).

(ii) For THC samples, the minimum FID (or HFID in the case of diesel-cycle vehicles) flow rate is 0.066 cfm (0.031 1/sec).

(iii) CFV sample flow rate is fixed by the venturi design.

(5) Attach the exhaust tube to the vehicle tailpipe(s).

(6) Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the exhaust sample bag, the dilution air sample bag, turn on the petroleum-fueled diesel-cycle THC analyzer system integrator, mark the recorder chart, and record both gas meter or flow measurement instrument readings, if applicable.

(7) Start the engine (with air conditioning system also running). Fifteen seconds after the engine starts, place vehicle in gear.

(8) Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule.

(9) Operate the vehicle according to the SC03 driving schedule.

(10) Turn the engine off 2 seconds after the end of the last deceleration (i.e., engine off at 596 seconds).

(11) Five seconds after the engine stops running, simultaneously turn off gas flow measuring device No. 1 (and the petroleum-fueled diesel hydrocarbon integrator No. 1 and mark the petroleum-fueled diesel hydrocarbon recorder chart if applicable) and position the sample selector valves to the ''standby'' position. Record the measured roll or shaft revolutions and the No. 1 gas meter reading or flow measurement instrument).

(12) As soon as possible, transfer the exhaust and dilution air bag samples to the analytical system and process the samples according to §86.140 obtaining a stabilized reading of the bag exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(13) Immediately after the end of the sample period, turn off the cooling fan, disconnect the exhaust tube from the vehicle tailpipe(s), and drive the vehicle from dynamometer.

(14) The CVS or CFV may be turned off, if desired.

(e) *NO_X humidity correction.* Calculated NO_X exhaust emissions from air conditioning tests conducted in an environmental test cell at a nominal 100 grains of water/pound of dry air are to be corrected for humidity to 100 grains of water/pound of dry air (see the relationship of §86.164–00(d)).

[61 FR 54895, Oct. 22, 1996, as amended at 70 FR 40434, July 13, 2005; 70 FR 72928, Dec. 8, 2005]

§86.161–00 Air conditioning environmental test facility ambient requirements.

The goal of an air conditioning test facility is to simulate the impact of an ambient heat load on the power requirements of the vehicle's air conditioning compressor while operating on a specific driving cycle. The environmental facility control elements that are discussed are ambient air temperature and humidity, minimum test cell size, solar heating, and vehicle frontal air flow.

(a) *Ambient air temperature.* (1) Ambient air temperature is controlled, within the test cell, during all phases of the air conditioning test sequence to 95 ±2 °F on average and 95 ±5 °F as an instantaneous measurement.

(2) Air temperature is recorded continuously at a minimum of 30 second intervals. Records of cell air temperatures and values of average test temperatures are maintained by the manufacturer for all certification related programs.

(b) *Ambient humidity.* (1) Ambient humidity is controlled, within the test cell, during all phases of the air conditioning test sequence to an average of 100 ±5 grains of water/pound of dry air.

(2) Humidity is recorded continuously at a minimum of 30 second intervals. Records of cell humidity and values of average test humidity are maintained by the manufacturer for all certification related programs.

(c) *Minimum test cell size.* (1) The recommended minimum environmental

exhaust emission test cell size is width 20 feet, length 40 feet, and height 10 feet.

(2) Test cells with smaller size dimensions may be approved by the Administrator if it can be shown that all of the ambient test condition performance requirements are satisfied.

(d) *Solar heat loading.* (1)(i) Acceptable types of radiant energy emitters that may be used for simulating solar heat load are:

(A) Metal halide;

(B) Quartz halogen with dichroic mirrors; and

(C) Sodium iodide.

(ii) The Administrator will approve other types of radiant energy emitters if the manufacturer can show they satisfy the requirements of this section.

(2) The height of the minimal cell size will dictate the type of radiant energy source that will satisfy the spectral distribution and uniformity definitions of this section.

(3) Radiant energy specifications. (i) Simulated solar radiant energy intensity is determined as an average of the two points measured at:

(A) Centerline of the test vehicle at the base of the windshield.

(B) Centerline of the vehicle at the base of the rear window (truck and van location defined as bottom of vertical window or where an optional window would be located).

(ii) The radiant energy intensity set point is 850 ±45 watts/square meter.

(iii) The definition of an acceptable spectral distribution is contained in the following table:

DEFINITION OF THE SPECTRAL DISTRIBUTION

Band width (nanometers)	Percent of total spectrum	
	Lower limit (percent)	Upper limit (percent)
<320	0	0
320–400	0	7
400–780	45	55
>780	35	53

NOTE: Filter the UV region between 280 and 320 wave lengths.

(iv) The angle of incidence of radiant energy is defined as 90 degrees from the test cell floor.

(v) The requirements for measuring the uniformity of radiant energy are:

(A) The radiant energy uniformity tolerance is ±15 percent of the radiant energy intensity set point of 850 watts/square meter.

(B) The uniformity of radiant energy intensity is measured at each point of a 0.5 meter grid over the entire footprint of the test vehicle at the elevation of one meter including the footprint edges.

(C) Radiant energy uniformity must be checked at least every 500 hours of emitter usage or every six months depending on which covers the shorter time period; and every time major changes in the solar simulation hardware occur.

(vi) The radiant energy intensity measurement instrument specifications (minimum) are:

(A) Sensitivity of 9 microvolts per watt/square meter;

(B) Response time of 1 second;

(C) Linearity of ±0.5 percent; and

(D) Cosine of ±1 percent from normalization 0–70 degree zenith angle.

(e) *Vehicle frontal air flow.* The Administrator will approve frontal air flow based on ''blower in box'' technology as an acceptable simulation of environmental air flow cooling for the air conditioning compressor and engine, provided the following requirements are satisfied.

(1) The minimum air flow nozzle discharge area must be equal or exceed the vehicle frontal inlet area. Optimum discharge area is 18 square feet (4.25×4.25), however, other sizes can be used.

(2) Air flow volumes must be proportional to vehicle speed. With the above optimum discharge size, the fan volume would vary from 0 cubic feet/minute (cfm) at 0 mph to approximately 95,000 cfm at 60 mph. If this fan is also the only source of cell air circulation or if fan operational mechanics make the 0 mph air flow requirement impractical, air flow of 2 mph or less will be allowed at 0 mph vehicle speed.

(3) The fan air flow velocity vector perpendicular to the axial flow velocity vector shall be less than 10 percent of the mean velocity measured at fan speeds corresponding to vehicle speeds of 20 and 40 mph.

(4)(i) Fan axial air flow velocity is measured two feet from nozzle outlet at each point of a one foot grid over the entire discharge area.

(ii) The uniformity of axial flow tolerance is 20 percent of the fan speeds corresponding to vehicle speeds of 20 and 40 mph.

(5) The instrument used to verify the air velocity must have an accuracy of 2 percent of the measured air flow speed.

(6) The fan discharge nozzle must be located 2 to 3 feet from the vehicle and 0 to 6 inches above the test cell floor during air conditioning testing. This applies to non-wind tunnel environmental test cells only.

(7) The design specifications discussed in paragraphs (e)(1) through (e)(5) of this section must be verified by the manufacturer prior to conducting certification air conditioning tests.

[61 FR 54897, Oct. 22, 1996, as amended at 70 FR 40434, July 13, 2005]

§ 86.162–00 Approval of alternative air conditioning test simulations and descriptions of AC1 and AC2.

The alternative air conditioning test procedures AC1 and AC2 are approved by the Administrator for all light-duty vehicles and light-duty trucks only for the model years of 2000, 2001, and 2002. To obtain Administrator approval of other simulation test procedures a manufacturer must satisfy the requirements of paragraph (a) of this section and meet the requirements of § 86.163–00. Air conditioning tests AC1 and AC2 are simulations of the environmental test cell air conditioning test discussed in § 86.160–00. AC1 simulates, in standard test cell ambient conditions and with the air conditioning off, the exhaust emission results of air conditioning operation in an environmental test cell by adding additional power requirements to roadload dynamometer requirements. AC2 simulates, in standard test cell ambient conditions and with the air conditioning controls in the heat position, the exhaust emission results of air conditioning operation in an environmental test cell by adding a heat load to the passenger compartment. The only differences between the test activities described in § 86.160–00 and those for AC1 and AC2 occur as the result of how the effect of the environmental cell ambient test conditions, defined in § 86.160–00(c)(5)(i), are simulated in a standard test cell nominal ambient conditions of 76 °F and 50 grains of water/pound of dry air. Paragraph (a) of this section discusses the procedure by which a manufacturer can obtain Administrator approval of other air conditioning test simulation procedures. Paragraph (b) of this section describes the AC1 test procedure and paragraph (c) of this section describes the AC2 test procedure.

(a) Upon petition from a manufacturer or upon the Agency's own initiative, the Administrator will approve a simulation of the environmental cell for air conditioning test (SC03) described in § 86.160–00 providing that the procedure can be run by the Administrator for SEA and in-use enforcement testing and providing that the criteria of paragraphs (a)(1)(2), and (3) of this section are satisfied.

(1) In deciding whether approvals will be granted, the Administrator may consider data showing how well the simulation matches environmental cell test data for the range of vehicles to be covered by the simulation including items such as the tailpipe emissions, air conditioning compressor load, and fuel economy.

(2) The Administrator has approved test procedures AC1 and AC2 for only the model years of 2000, 2001, and 2002.

(3) Excluding the AC1 and AC2 procedures described in paragraphs (b) and (c) of this section for model years 2000, 2001, and 2002, for any simulation approved under paragraph (a) of this section, the manufacturer must agree to be subject to an ongoing yearly correlation spot check as described in § 86.163–00.

(4) Once a simulation is approved and used by a manufacturer for testing for a given vehicle, EPA agrees to use the simulation test procedure for all official testing conducted on that vehicle by the Agency for certification, SEA, and recall purposes, excluding spot check testing and vehicles which fail the spot check criteria as described in § 86.163–00.

(5) EPA will moniter the aggregate results of spot check testing and full